

967.3 and DE-PS 195 11 967.3, as well as their published equivalents, are hereby incorporated by reference as if set forth in their entirety herein.

The invention as described hereinabove in the context of the preferred embodiments is not to be taken as limited to all of the provided details thereof, since modifications and variations thereof may be made without departing from the spirit and scope of the invention.

#### PARTIAL NOMENCLATURE

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- 1 Means
  - 2 Clutch housing
  - 3 Membrane spring
  - 4 Application plate
  - 5 Insulation
  - 6 Protective device
  - 7 Ring-shaped body
  - 8 Flexible tabs
  - 9 Application edge
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What is claimed is:

1. A friction clutch for a motor vehicle, said friction clutch comprising:

- a clutch housing;
- a clutch disc;
- said clutch disc being configured to be mounted on a transmission input shaft having a longitudinal axis;
- said clutch disc being configured to be axially movable along the longitudinal axis of a transmission input shaft;
- a pressure plate;
- at least one friction lining mounted on said clutch disc;
- said at least one friction lining being configured to be disposed between said pressure plate and a flywheel;
- said pressure plate being configured and disposed to engage and disengage said clutch disc with a flywheel;
- said pressure plate being configured and disposed to be axially movable along the longitudinal axis of a transmission input shaft;
- a membrane spring;
- said membrane spring being disposed between said clutch housing and said pressure plate;
- said membrane spring being configured and disposed to bias said pressure plate;
- a thermal insulating member being configured to minimize heat conduction from said pressure plate to said membrane spring;
- said insulating member being disposed between said pressure plate and said membrane spring;
- said insulating member being rigid;
- said insulating member comprising a first surface and a second surface;
- said first surface of said insulating member being disposed to contact said membrane spring;
- said second surface of said insulating member being disposed to contact said pressure plate;
- said insulating member comprising a metal;
- said metal of said insulating member being configured to minimize heat conduction from said pressure plate to said membrane spring to minimize distortion of said membrane spring from thermal conduction of heat from said pressure plate to said membrane spring;
- said membrane spring comprising a first material;
- said first material having a first resistance to thermal conductivity;

said pressure plate comprising a second material;  
 said second material having a second resistance to thermal conductivity;  
 said metal of said insulating member having a third resistance to thermal conductivity;  
 the third resistance to thermal conductivity being substantially greater than at least one of: the first resistance to thermal conductivity and the second resistance to thermal conductivity;  
 an arrangement to further minimize heat conduction from said pressure plate to said membrane spring;  
 said arrangement to further minimize heat conduction comprising the following set of characteristics:  
 said metal of said insulating member representing a first insulating material;  
 said insulating member comprising a metal portion and an additional portion;  
 said metal portion of said insulating member comprising said metal of said insulating member;  
 said additional portion of said insulating member being configured to further minimize heat conduction from said pressure plate to said membrane spring to minimize distortion of said membrane spring from thermal conduction of heat from said pressure plate to said membrane spring; and  
 said additional portion of said insulating member comprising a second insulating material;  
 said second insulating material comprising plastic; and  
 said plastic being substantially heat resistant.

2. A friction clutch for a motor vehicle, said friction clutch comprising:

a clutch housing;  
 a clutch disc;  
 said clutch disc being configured to be mounted on a transmission input shaft having a longitudinal axis;  
 said clutch disc being configured to be axially movable along the longitudinal axis of a transmission input shaft;  
 a pressure plate;  
 at least one friction lining mounted on said clutch disc;  
 said at least one friction lining being configured to be disposed between said pressure plate and a flywheel;  
 said pressure plate being configured and disposed to engage and disengage said clutch disc with a flywheel;  
 said pressure plate being configured and disposed to be axially movable along the longitudinal axis of a transmission input shaft;  
 a membrane spring;  
 said membrane spring being disposed between said clutch housing and said pressure plate;  
 said membrane spring being configured and disposed to bias said pressure plate;  
 said pressure plate comprising a first portion and a second portion;  
 said first portion of said pressure plate being disposed to contact said clutch disc;  
 said second portion of said pressure plate being disposed away from said clutch disc;  
 a thermal insulating member being configured to minimize heat conduction from said pressure plate to said membrane spring;  
 said insulating member being disposed between said membrane spring and said first portion of said pressure plate;

one of said insulating member and said second portion of said pressure plate being disposed to contact said membrane spring;  
 said insulating member being rigid;  
 said insulating member comprising a metal;  
 said metal of said insulating member being configured to minimize heat conduction from said first portion of said pressure plate to said membrane spring to minimize distortion of said membrane spring from thermal conduction of heat from said pressure plate to said membrane spring;  
 said membrane spring comprising a first material;  
 said first material having a first resistance to thermal conductivity;  
 said pressure plate comprising a second material;  
 said second material having a second resistance to thermal conductivity;  
 said metal of said insulating member having a third resistance to thermal conductivity;  
 the third resistance to thermal conductivity being substantially greater than at least one of: the first resistance to thermal conductivity and the second resistance to thermal conductivity;  
 each of said membrane spring and said pressure plate being configured to rotate about an axis of rotation;  
 said membrane spring comprising an inner portion and an outer portion;  
 said outer portion of said membrane spring being disposed radially farther from the axis of rotation of said membrane spring than said inner portion of said membrane spring;  
 said second portion of said pressure plate comprising an inner portion and an outer portion;  
 said outer portion of said second portion of said pressure plate being disposed radially farther from the axis of rotation of said pressure plate than said inner portion of said second portion of said pressure plate;  
 said insulating member being disposed adjacent one of said outer portion of said membrane spring and said outer portion of said second portion of said pressure plate;  
 said insulating member being disposed to extend circumferentially along at least a portion of said one of said outer portion of said membrane spring and said outer portion of said second portion of said pressure plate;  
 a device to protect said membrane spring from conduction of heat from said pressure plate to said membrane spring;  
 said protective device comprising said insulating member;  
 said insulating member having an annular shape enclosing the axis of rotation;  
 said protective device being disposed to adhere to said outer portion of said second portion of said pressure plate;  
 said metal of said insulating member being a first insulating material;  
 said insulating member being disposed between said membrane spring and said second portion of said pressure plate;  
 said insulating member comprising a metal portion and at least one additional portion;  
 said metal portion comprising said metal of said insulating member;

said at least one additional portion of said insulating member comprising a second insulating material; and said at least one additional portion of said insulating member being disposed to contact said membrane spring.

3. A friction clutch for a motor vehicle, said friction clutch comprising:

a clutch housing;

a clutch disc;

said clutch disc being configured to be mounted on a transmission input shaft having a longitudinal axis;

said clutch disc being configured to be axially movable along the longitudinal axis of a transmission input shaft;

a pressure plate;

at least one friction lining mounted on said clutch disc;

said at least one friction lining being configured to be disposed between said pressure plate and a flywheel;

said pressure plate being configured and disposed to engage and disengage said clutch disc with a flywheel;

said pressure plate being configured and disposed to be axially movable along the longitudinal axis of a transmission input shaft;

a membrane spring;

said membrane spring being disposed between said clutch housing and said pressure plate;

said membrane spring being configured and disposed to bias said pressure plate;

said pressure plate comprising a first portion and a second portion;

said first portion of said pressure plate being disposed to contact said clutch disc;

said second portion of said pressure plate being disposed away from said clutch disc;

a thermal insulating member being configured to minimize heat conduction from said pressure plate to said membrane spring;

said insulating member being disposed between said membrane spring and said first portion of said pressure plate;

one of said insulating member and said second portion of said pressure plate being disposed to contact said membrane spring;

said insulating member being rigid;

said insulating member comprising a metal;

said metal of said insulating member being configured to minimize heat conduction from said first portion of said pressure plate to said membrane spring to minimize distortion of said membrane spring from thermal conduction of heat from said pressure plate to said membrane spring;

said membrane spring comprising a first material;

said first material having a first resistance to thermal conductivity;

said pressure plate comprising a second material;

said second material having a second resistance to thermal conductivity;

said metal of said insulating member having a third resistance to thermal conductivity;

the third resistance to thermal conductivity being substantially greater than at least one of: the first resistance to thermal conductivity and the second resistance to thermal conductivity;

an arrangement to further minimize heat conduction from said pressure plate to said membrane spring;

said arrangement to further minimize heat conduction comprising the following set of characteristics:

said metal of said insulating member representing a first insulating material;

said insulating member comprising a metal portion and an additional portion;

said metal portion of said insulating member comprising said metal of said insulating member;

said additional portion of said insulating member being configured to further minimize heat conduction from said pressure plate to said membrane spring to minimize distortion of said membrane spring from thermal conduction of heat from said pressure plate to said membrane spring; and

said additional portion of said insulating member comprising a second insulating material;

said second insulating material comprising plastic; and said plastic being substantially heat resistant.

4. A friction clutch for a motor vehicle, said friction clutch comprising:

a clutch housing;

a clutch disc;

said clutch disc being configured to be mounted on a transmission input shaft having a longitudinal axis;

said clutch disc being configured to be axially movable along the longitudinal axis of a transmission input shaft;

a pressure plate;

at least one friction lining mounted on said clutch disc;

said at least one friction lining being configured to be disposed between said pressure plate and a flywheel;

said pressure plate being configured and disposed to engage and disengage said clutch disc with a flywheel;

said pressure plate being configured and disposed to be axially movable along the longitudinal axis of a transmission input shaft;

a membrane spring;

said membrane spring being disposed between said clutch housing and said pressure plate;

said membrane spring being configured and disposed to bias said pressure plate;

said pressure plate comprising a first portion and a second portion;

said first portion of said pressure plate being disposed to contact said clutch disc;

said second portion of said pressure plate being disposed away from said clutch disc;

a thermal insulating member being configured to minimize heat conduction from said pressure plate to said membrane spring;  
 said insulating member being disposed between said membrane spring and said first portion of said pressure plate;  
 one of said insulating member and said second portion of said pressure plate being disposed to contact said membrane spring;  
 said insulating member being rigid;  
 said insulating member being configured to minimize heat conduction from said first portion of said pressure plate to said membrane spring to minimize distortion of said membrane spring from thermal conduction of heat from said pressure plate to said membrane spring;  
 said pressure plate being a unitary one-piece component of said friction clutch;  
 said membrane spring comprising a first material;  
 said first material having a first resistance to thermal conductivity;  
 said pressure plate comprising a second material;  
 said second material having a second resistance to thermal conductivity;  
 said insulating member comprising a third material;  
 said third material having a third resistance to thermal conductivity;  
 the third resistance to thermal conductivity being substantially greater than at least one of: the first resistance to thermal conductivity and the second resistance to thermal conductivity;  
 said third material of said insulating member comprising metal;  
 an arrangement to further minimize heat conduction from said pressure plate to said membrane spring;  
 said arrangement to further minimize heat conduction comprising the following set of characteristics:  
 said metal of said insulating member representing a first insulating material;  
 said insulating member comprising a metal portion and an additional portion;  
 said metal portion of said insulating member comprising said metal of said insulating member; and  
 said additional portion of said insulating member comprising a second insulating material;  
 said second insulating material comprising plastic; and  
 said plastic being substantially heat resistant.

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5. A single disc friction clutch for a motor vehicle, comprising:  
a clutch housing;  
a single clutch disc being configured to be mounted on a transmission input shaft having  
a longitudinal axis;  
said single clutch disc being configured to be axially movable along the longitudinal axis  
of a transmission input shaft;  
a solid pressure plate having a surface;  
at least one friction lining mounted on said clutch disc; said at least one friction lining  
being configured to be disposed between said pressure plate and a flywheel;  
said pressure plate being configured and disposed to engage and disengage said clutch  
disc with a flywheel; said pressure plate being configured and disposed to be axially movable  
along the longitudinal axis of a transmission input shaft;  
a membrane spring; said membrane spring being disposed between said clutch housing  
and said pressure plate and having on one axial side a radially extending surface facing said  
pressure plate;  
said membrane spring being configured and disposed to bias said pressure plate;  
a thermal insulating member supported on said surface of said pressure plate and  
disposed between said pressure plate and said membrane spring so that the insulating member is  
only in axial contact with said radially extending surface of said membrane spring;  
said thermal insulating member being configured to minimize the contact between said  
thermal insulating member and said membrane spring;  
said insulating member extending circumferentially about said pressure plate and having  
a first resistance to thermal conductivity and said membrane spring has a second resistance to

thermal conductivity, and wherein said first resistance to thermal conductivity is higher than said second resistance;

said thermal insulating member being rigid and comprising a metal;

said metal of said insulating member being configured to minimize heat conduction from said pressure plate to said membrane spring.

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Cal 7 6. The friction clutch of claim 5, wherein said insulating member comprises a first surface and a second surface; said first surface being disposed to contact said membrane spring and said second surface being disposed to contact said pressure plate.

7. The friction clutch of claim 5, wherein said membrane spring comprises a first material; said first material has a first resistance to thermal conductivity; said pressure plate comprises a second material; said second material has a second resistance to thermal conductivity; said metal of said insulating member has a third resistance to thermal conductivity; and the third resistance to thermal conductivity is greater than at least one of the first resistance to thermal conductivity and the second resistance to thermal conductivity.

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AI 8. A single disc friction clutch for a motor vehicle, said friction clutch comprising:  
a clutch housing;  
a clutch disc;  
said single clutch disc being configured to be mounted on a transmission input shaft having a longitudinal axis;



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said single clutch disc being configured to be axially movable along the longitudinal axis of a transmission input shaft;

a pressure plate;

at least one friction lining mounted on said clutch disc;

said at least one friction lining being configured to be disposed between said pressure plate and a flywheel;

said pressure plate being configured and disposed to engage and disengage said clutch disc with a flywheel;

said pressure plate being configured and disposed to be axially movable along the longitudinal axis of a transmission input shaft;

a membrane spring;

said membrane spring being disposed between said clutch housing and said pressure plate;

said membrane spring being configured and disposed to bias said pressure plate;

said pressure plate comprising a first portion and a second portion;

said first portion of said pressure plate being disposed to contact said clutch disc;

said second portion of said pressure plate being disposed away from said clutch disc;

a thermal insulating member being configured to minimize heat conduction from said pressure plate to said membrane spring;

said insulating member being disposed between said membrane spring and said first portion of said pressure plate;

said second portion of said pressure plate being disposed to contact said membrane spring;